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Indian Standard

TOLERANCES ON DIMENSIONS OF TUBES, PINS AND RODS OF MAGNETIC OXIDES

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TOLERANCES ON DIMENSIONS OF TUBES, PINS AND RODS OF MAGNETIC OXIDES

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Indian Standard

TOLERANCES ON DIMENSIONS OF TUBES, PINS AND RODS OF MAGNETIC OXIDES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 27 October 1980, after the draft finalized by the Magnetic Components and Ferrite Materials Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 It is felt that in view of the manufacturing techniques normally used for these parts, it is not worthwhile to try and arrive at a simple set of recommended standard values for the dimensions. On the other hand, the users are interested to know in what range of sizes they may order these parts and what are the usual tolerances and shape inaccuracies which should apply. As such, the scope of this standard, at present, is restricted to tolerances on main dimensions and shape inaccuracies. The main dimensions are kept under consideration and will be added later.

0.3 In the preparation of this standard, assistance has been derived from IEC Pub 220 (1966) ' Dimensions of tubes, pins and rods of ferromagnetic oxides ' issued by International Electrotechnical Commission.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies tolerances on main dimensions and shape inaccuracies of tubes, pins and rods with an outer diameter of 25 mm (*max*) and with circular cross-section.

1.2 It does not apply to aerial rods and slabs.

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*Rules for rounding off numerical values (*revised*).

2. DIAMETER

2.1 External Diameter — Tubes, pins and rods may be made with or without centreless grindings.

2.1.1 *Without Centreless Grinding* — The tolerance on the outer diameter should be ± 5 percent for 1 mm outer diameter graded to ± 3 percent for 10 mm and over outer diameter.

2.1.2 *With Centreless Grinding* — The total tolerance normally permitted is 0·05 mm for the outer diameter. Closer tolerances than 0·05 mm may be obtained but that requires additional measures in manufacture.

2.2 Inner Diameter and Wall Thickness

2.2.1 *Inner Diameter* — The tolerance on the inner diameter may be + 10 percent with a minimum of + 0·2 mm to + 0·3 mm.

2.2.2 *Wall Thickness* — The wall thickness at the thinnest place should preferably be not less than 0·2 times the nominal outer diameter. In view of the eccentricity (*see* **2.3**), the inner diameter should, therefore, not exceed 0·5 times the outer diameter.

2.3 Gauge — A suitable gauge is shown in Fig. 1. The gauge is only meant for checking the combination of eccentricity and dimensional variation at the extremities of the tube.

NOTE — Apart from this, all other dimensions shall be checked for compliance with the specified values.

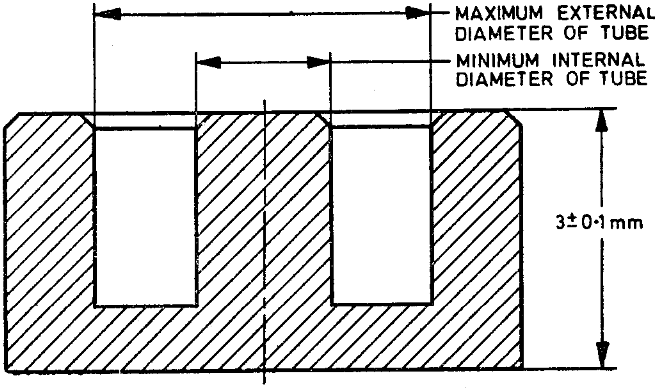
MAXIMUM EXTERNAL DIAMETER OF TUBE
MINIMUM INTERNAL DIAMETER OF TUBE
3±0·1 mm

FIG. 1 GAUGE

3. LENGTH

3.1 Centreless Grinding — For centreless ground tubes, pins and rods, the length should preferably lie between 2 and 10 times the outer diameter.

3.2 Cutting Before Firing — For moulded pieces and for extruded pieces cut before firing, the tolerances on the length shall be ± 3 percent of the length.

3.3 Cutting After Firing — When the pieces are cut after firing, the tolerances on the length may be reduced to ± 0·1 mm. The angularity of the end faces shall then be taken into account, which may result in a difference in length measured at two opposite sides of about 10 percent of the outer diameter.

4. CURVATURE

4.1 Value — The curvature is characterized by the maximum deviation from the straight line through the end face centres. For pieces up to 45 mm length, this curvature is not more than 0·2 mm and independent of the length. For longer pieces up to 80 mm length, the maximum curvature corresponds to a circle with a radius of 1·250 mm and is, therefore, proportional to the square of the length.

4.1.1 For pieces over 80 mm length, the curvature is in different directions and for that reason it is not dependent upon the length.

4.1.2 The total curvature of longer specimens may be somewhat greater than that permitted over a length of 80 mm by the gauge specified in **4.2** but this difference generally is negligible.

4.2 Gauge for Checking the Curvature — This curvature may be checked by means of a tubular gauge with dimensions as given in Table 1.

TABLE 1 GAUGE FOR CHECKING CURVATURE

LENGTH OF SPECIMEN	GAUGE	
	Length with Tolerance of ± 0·05 mm	Inner Diameter with Tolerance of ± 0·01 mm
< 45 mm	45 mm	$d_{\max}$ ± 0·2 mm
45 mm to 80 mm	Length of specimen	$d_{\max} + \left(\frac{L}{100}\right)^2$ mm
> 80 mm	80 mm	$d_{\max}$ + 0·64 mm

where

d = inner diameter of the gauge, and

L = length of the specimen.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2